# Clean streets for clean air in Hamilton

The control of street dust may be Environment Ontario's next target in its fight against air pollution. To establish how much such dust contributes to the contamination of air by particulates and how effective street cleaning is, Environment Ontario has commissioned a two-year $425,000 study to be undertaken in Hamilton.

The study, by United Technology and Science Inc., will be financed by a $223,000 contribution from Environment Canada, $177,000 from Environment Ontario, $15,000 from the Steel Company of Canada and $10,000 from Dofasco.

Since 1970 Hamilton industry has spent $80 million on air pollution control, Colin Macfarlane, director of Environment Ontario's West Central region, said. This expenditure has reduced the industry's contribution to the amount of particulates in Hamilton's air by 29 per cent from about 60 to 22 micrograms of particulates per cubic meter of air. During the same time, contributions from the city have remained constant at about 40 micrograms per cubic meter.

A further reduction of industrial dust from 22 to 14 micrograms per cubic meter by 1985 would cost another $80 million. The study is designed to show whether the same effect could be achieved at much lower cost by improvement of street cleaning methods.

Hamilton has been selected for the study mainly because its industrial mix allows a relatively easy identification and analysis of particulates.

During the first year, field studies will be carried out in selected Hamilton streets. Year two will be devoted to the analysis of the data.

The study is expected to provide sound scientific information on the proportion of air pollution attributable to road dust and to industry. Best and least costly methods of control will also be identified to serve eventually as models for other urban areas.

ENVIRONMENT ONTARIO — LEGACY

Vol. 8, No. 2 September 1979



(photo: Hans Eijsenck)



## In LEGACY



## Puppets carry Ecolo-gee message

Sponsored by Environment Ontario and guided by puppeteer Keith Martin, puppets Bernie and Alice star in Ecolo-gee, a puppet theatre with an ecological message, shown four times daily at Environment Ontario's display in the Better Living Centre at the Canadian National Exhibition.

In a soap opera format complete with organ interludes, the "Adventures of Bernie and Alice" unfold as the puppets search for a pollution-free environment. Their search leads only to the discovery of litter, smog and noise everywhere.

Their guest also introduces them to various creatures of the woods, each with its own message about ecology and pollution. These messages indirectly inform the audience about their environment and what they can do to keep it clean. Eventually the country creatures and Bernie are introduced to a new character called Zip.

Zip, a self-proclaimed Waste-Watcher, informs them of the different ways humans can help to keep the environment clean. Among his suggestions are picking up after picnics, using returnable bottles and recycling.

Experience '79

## 389 students build better environment

Is it possible to place a dollar value on experience?

The 389 students who worked for the Ministry of the Environment in Experience '79 this summer probably don't think so. Over 100 research projects gave them invaluable career-related experience.

But Environment Ontario can put a price on it: the total budget this year of less than $576,000, which paid the students an average of 12 weeks at the provincial minimum wage and covered project expenses, has provided important environmental research to the Ministry staff.

The Ontario Youth Secretariat organizes the Experience program, which provided summer jobs across the province for the seventh consecutive summer for young people with appropriate skills and education.

Environment Ontario's projects covered a broad range of subjects.

In Peterborough, Gravenhurst, Sault St. Marie, Kingston and Ottawa, seventeen young people surveyed cottage septic tank systems, detailing property layout and facilities. Ministry abatement staff then ensured that pollution problems — often drainage from pipes discharged on the ground rather than into a leaching pit — were corrected as soon as possible.

On the Pic No. 50 Reserve in Heron Bay, students removed about 165 old cars from roadside, bush and backyard areas. They also increased community awareness of pollution and poison control with visits to households, posters and a "Litter Day".

At the University of Windsor, nine students worked on two studies to combat noise pollution through measurement of vehicle and construction noise to develop guidelines for their control.

Sudbury is a little greener, thanks to a land revegetation project undertaken at Laurentian University by nine students, to improve land adversely affected by lumbering operations at the turn of the century and emissions from local smelting operations in recent years.

At Queen's University in Kingston, students are studying the wilderness and recreational importance of peat bogs in Eastern Ontario.

Four students travelled throughout Ontario, visiting camps and provincial parks to promote a better understanding of environmental matters, through "KEEP", (Kids Environmental Education Program) with studies such as "Belly Botany", a close examination of the ecosystem in a small section of grass.

# It's all one world...

## Fewer forests - more $CO_2$

New light is shed on the threat to world climate by the greenhouse effect created by a $CO_2$ enrichment of the atmosphere in an article recently published in the British New Scientist. Author Dr. John Gribbin uses research done at the universities of Sao Paolo, Brazil, Waikoto, New Zealand and at the Marine Biological Laboratory, Woods Hole, Mass., to show that the measured increase of $CO_2$ in our atmosphere is primarily due to the reduction of the world's forest cover.

Fossil fuel (or industry) generated $CO_2$ could easily be absorbed by the Earth's plant growth, if our forests were left alone, the research indicates.

Unfortunately, about 11 million hectares (about 27.5 million acres) of forest are destroyed yearly, mainly in developing countries through wood burning for fuel and by slash and burn agriculture.

This not only adds about as much $CO_2$ to the atmosphere as industry does — it also deprives the world of one of its two largest natural $CO_2$ sinks, the other being the sea.

The pioneer agricultural explosion in the past 150 years in North America, eastern Europe, Australia, New Zealand and South Africa, during which vast forests were burned to produce land for farming, probably has increased the $CO_2$ concentration in the atmosphere by 10 per cent. This demonstrated increase has led to a 0.5 C rise in mean global temperature in the late 19th century.

To stop further increases in $CO_2$ content of the atmosphere humanity must stop destroying its forests. While the total area of forest is largely stabilized in North America and even promises some increase in the future, in many developing countries forests are still burned for a short lived gain in agricultural land. After a few years of exploitation by farming, the formerly forested areas deteriorate into sterile dust bowls.

A sound, growing forest cover could effectively change the trend toward an irreversible alteration of the delicately balanced atmosphere and allow the continuation of industrial production which is vitally important for a large part of Earth's population.

### Controls for controls

Electrostatic precipitators, used on coal fired furnaces to control the emission of fly ash, may themselves create health hazards by influencing the electrical condition of the atmosphere, experts of the US National Oceanographic and Atmospheric Administration claim. They have estimated that 250 such control installations may change the rain pattern of an area by charging the surrounding atmosphere with an electric load equivalent to a thunderstorm.

### Montreal cleans up

Montreal has plans and is now trying to secure financing for a $300 million sewage treatment plant to be built in the east end of the city. Quebec's Environment Ministry has promised to pay 74 per cent of the cost, the federal government 16 per cent. The Montreal Urban Community is considering financing the remaining 10 per cent. Up to now Montreal's sewage is dumped raw into the St. Lawrence River.

### It's because of the lead

Next time the policeman who gives you a ticket seems cross and irritable, don't blame it on yourself. It may be because of the lead he has absorbed during target practice.

New York's Mount Sinai School of Medicine recently found that over half of 81 New York policemen tested had high levels of lead in their blood after returning from the firing range. Such contamination causes headaches, dizzy spells, insomnia and possibly loss of weight and stomach problems.

To prevent the poisoning of the arm of the law with lead, Smith and Wesson is now making bullets wrapped in nylon to keep the air on pistol firing ranges clean.

## Deputy Minister appoints new regional directors

Environment Ontario Deputy Minister Graham W.S. Scott has announced the appointment of Colin J. Macfarlane as director of the ministry's Central Region and Grant H. Mills as director of West Central Region. Both appointments are effective September 1st.

Mr. Macfarlane succeeds Paul G. Cockburn who has left the ministry to join a consulting firm in Saudi Arabia. A graduate of the University of Glasgow with post-graduate studies at the University of British Columbia, Mr. Macfarlane was previously director of West Central Region. Prior to this, he was director of the ministry's air management branch.

Mr. Mills, director of water resources branch since 1974, succeeds Mr. Macfarlane in West Central Region. A civil engineering graduate from the University of Toronto, Mr. Mills worked in the Hamilton city engineer's office before joining the surface water branch of the Ontario Water Resources Commission. At the time OWRC was incorporated in the Ministry of the Environment, he was supervisor of design approvals for the sanitary engineering branch.

## Black hole recycling

Our world's garbage disposal and recycling problems could be easily solved if the centre of our galaxy consisted of a black hole, as an article published in the July 1979 issue of Scientific American suggests.

All we would have to do to get rid of the stuff would be to shoot it into space, past the gravitational pull of the sun, as has been done with a number of spacecraft now on their way.

The stuff would eventually follow the galaxies strongest gravitational pull and end up in the above mentioned black hole which, as experts tell us, swallows everything, including light.

As it is hard to believe that matter and energy can be completely destroyed; one must assume that it will have to come out of the other end of the black hole in, necessarily, a negative universe.

In such a negative universe our garbage would come out as valuable goodies. The catch is that the inhabitants of such a negative universe would, of course, have attitudes opposite to ours, and could therefore end up being showered with stuff that we may consider valuable raw materials but they themselves would view as garbage. But that then would be their problem. Which they could in turn solve by disposing of it in black holes of their universe.

## Rats survive by adaptation

Evolution of life on Earth is the result of the continuous adaptation of living organisms to their environment and Australian biologists have found a good example of such an evolutionary event in their outbacks. Studying the effects of a pesticide, sodium fluoroacetate, on small animals they discovered a population of bush rats that can tolerate 30 times the amount of this poison that would kill a normal bush rat.

The immune rat population owes its survival to its adaptation to the consumption of a species of plant growing abundantly in its area and containing a concentration of fluoroacetate lethal to all other animals. It seems that plants and rats are locked in an ongoing battle — the plant increasing its poison content to protect itself and the rats developing greater tolerances to survive in an area covered generally with tough scrub with little nourishing value.

A parallel discovery was made by Canadian researchers into the effect of heavy metals on the nervous system. They had to use pigeons for their tests, as rats have developed during thousands of years of living close to man a high tolerance for heavy metals in their food.

Ministry of the Environment
Ontario

Hon. Harry C. Parrott, D.D.S., Minister
Graham W.S. Scott, Deputy Minister

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# Small fish tell researchers big secrets...

**Environment Ontario technician Catherine Curry and summer student Frank Hedley work the fine meshed net to catch young fish for further studies.** **(photo: Tessa Buchan)**

Small fish less than one year old may give researchers more information on fish contaminants than their grown relatives, a new addition to Environment Ontario's fish testing program indicates.

Karl Suns and Catherine Curry, two scientists of Environment Ontario's limnology and toxicology section, have spent a good part of the past summer catching such yearlings of various species at various locations in the Great Lakes and in water known to be contaminated.

As young fish travel only over short distances and have lived only a short time, they can pinpoint sources of contamination much better in space and time than older fish caught and investigated in the Ministry's sport fish testing program.

Young fish sampling is being applied to pollution investigations in the Wabigoon-English River area, to the study of the effects of acidic precipitation on mercury uptake by fish, the effects of PCB in road oiling on water and fish, to measure the effectiveness of domestic sewage treatment plants and to determine contaminant sources in the Great Lakes.

A repetition of such tests as are now done in the Great Lakes will also indicate quite reliably whether the contamination of fish is increasing or decreasing, and what effect various control measures have.

# Water policies updated

Ontario has set new, tougher water protection policies in a new publication released by Environment Minister Harry C. Parrott recently.

The new handbook, 'Water Management — Goals, Policies, Objectives and Implementation Procedures of the Ministry of the Environment', is a thorough revision and expansion of the 1970 publication, 'Guidelines and Criteria for Water Quality Management in Ontario', Dr. Parrott said. It expands on the surface water quality guidelines and criteria in the earlier publication and deals also with ground water quality and ground and surface water quantity.

"The new handbook spells out stricter control of hazardous substances and reflects the latest scientific advances and the recommendations of the International Joint Commission on Great Lakes water quality," Dr. Parrott said.

"After careful consideration we have rejected the use of rigid Province-wide water quality standards," he said. "Our approach is to include legally enforceable, site-specific effluent requirements in approvals issued by my Ministry. By applying our revised Water Quality Objectives in this way, we can tailor effluent treatment to local environmental needs and effectively enforce these requirements.

## *nutrient level reduced...*

"Under the 1970 criteria significant progress was made in the protection of Ontario waters. Our phosphorus removal program, for example, has reduced nutrient levels in a number of areas such as the Bay of Quinte and inshore waters of Lake Ontario.

"The mercury abatement program, instituted in 1970, has led to a reduction of the mercury contamination of fish in Lake St. Clair to about half of its 1970 levels.

"Under the new, revised approach my Ministry's goal will be that the quality of all surface waters be suitable for aquatic life and recreation. If these uses are protected, the water will also be suitable as source for public water supply and crop irrigation.

"We have prohibited discharges of specified hazardous substances including mercury, PCBs and DDT, and we will be evaluating other potentially hazardous substances, for which water quality objectives have not yet been set, on an individual basis. These and other measures will result in major improvements to water quality in Ontario," Dr. Parrott said.

In the new publication, water quality criteria are called 'Provincial Water Quality Objectives'. The principal goals and policy statements for water quality are:

— Waters of a quality better than the Objectives will be protected from future degradation, while waters of impaired quality will be improved by taking all practical measures possible.

— Wastewater discharge requirements will be established on a case-by-case basis.

— Ground water will be protected for the greatest number of uses, primarily for human consumption, followed by other important uses such as livestock watering and crop irrigation.

— The effects on ground water quality of proposed waste discharges requiring Ministry approval will be controlled to protect beneficial water uses, and the requirements on quality and quantity of discharges will be stipulated in Ministry approvals.

The Ministry's surface and ground water quantity management program is also spelled out in the publication.

Copies of the publication are available from Environment Ontario's water resources and information services branch offices, from all the Ministry's regional offices, and from the Ontario Government Bookstore at 880 Bay Street, Toronto.

# Where environment is a scien

Increasing awareness of the environmental impact of industrial, agricultural, and municipal pollution, coupled with new scientific developments, have resulted in a growing demand for the services of Environment Ontario's laboratories. This increasing need is reflected in the number of tests performed; currently the laboratories perform close to 1.8 million tests per year.

The majority of these tests (77%) are carried out in the Ministry's central laboratory in Toronto. The remainder is shared by the Ministry's regional laboratories — Kingston (7%), Thunder Bay (5%) and London (11%).

More than 300 different tests are routinely done on all types of environmental samples for metals, organic and inorganic contaminants, and microbiological parameters. These tests are conducted on air, water, soil, sewage, fish, vegetation, industrial wastes and other types of environmental samples. The large workload is processed in a streamlined sample handling system with increased reliance on computerized and automated methodology and best use of equipment.

Major instrumentation has been brought on-line which allows diagnostic and multi-elemental analysis on a production - line. For example, X-ray fluorescence is now being used to determine trace metals.

The Dionex-ion exchange chromatograph has been introduced for the sequential determination of several anions in various types of environmental samples. The emission spectrograph, which uses a variety of energy sources including Inductively Coupled Plasma, is now analyzing up to six metals simultaneously in certain types of samples. It also scans for up to forty metals in powdered samples.

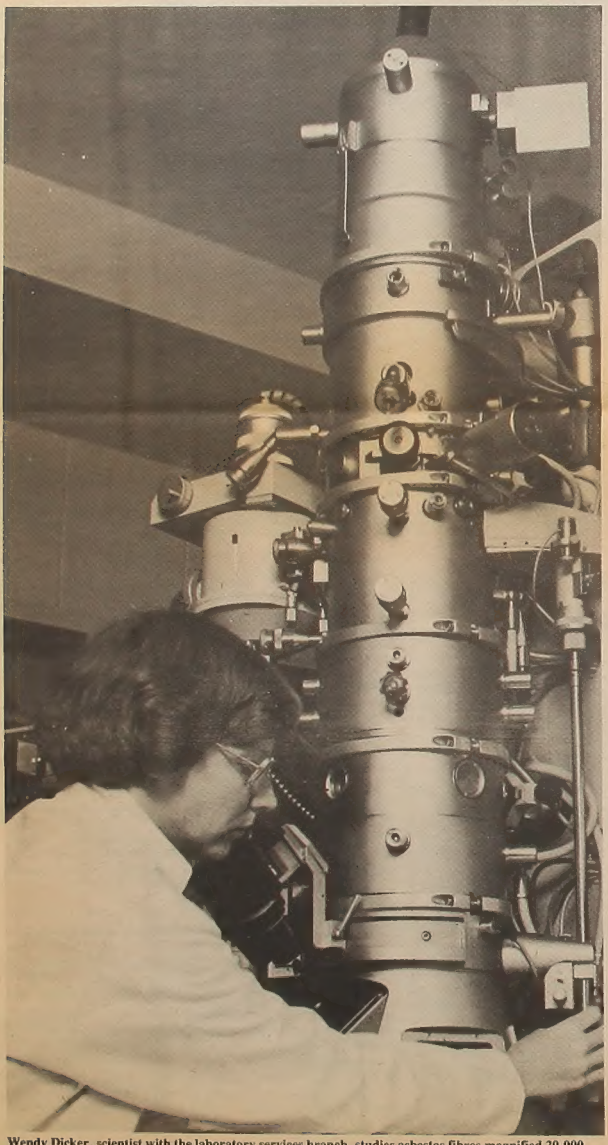
A bench-top gas chromatograph - mass spectrometer (GC-MS) system was brought on-line in the pesticide laboratory for the identification of pesticides, PCBs, and their degradation products. GC-MS techniques are also now used to identify new organic pollutants, and they are combined with purging techniques to scan biological material such as fish tissue for volatile organics — a one-day test that once required months to complete.

Automatic data acquisition by sophisticated computer approaches has streamlined the mercury and PCB fish contaminant programs. Recently the whole analytical process for mercury was computerized, with the result of improved productivity, precision and accuracy in the Ministry's fish testing program.

Automation of complex analytical procedures has also led to vast improvements in efficiency. Haloforms in drinking water are now analyzed by an automated gas chromatograph. A battery of four automated gas chromatographs directed by a computer is used to conduct routinely pesticides analyses on a variety of sample types. In the water quality laboratory, manganese, ammonia and total organic carbon tests were automated while in the air quality laboratory, selenium, arsenic, and antimony testing in water, hi-volume filters, vegetation, and biological materials was automated for flameless atomic absorption analysis.

Several new methods were developed and old methods were modified to permit more accurate, more productive, or more extensive testing. New methods developed in this manner involve the identification of sulfur and chlorine in organic liquid wastes, of sulfur compounds in atmospheric samples, determination of the forms of phosphorous and trace metals in water, complexing capacity of water, and the identification of petroleum hydrocarbon residues in drinking water.

A number of other methods were also modified to improve the scope of analysis. A fluoride specific electrode was investigated and recommended for low level fluoride analysis in water; an automated oceanographic respirometer was combined with the BOD technique; and a gas chromatographic technique was developed for the measurement of dissolved $CO_2$ in water.



**Wendy Dicker, scientist with the laboratory services branch, studies asbestos fibres magnified 20,000 times in the electron microscope.**

**Dr. Dave Rokosh of the microbiology section, prepares a specimen for m**

# nce...

The measurement and determi-
tion of asbestos in water has long
en a difficult problem. Over the
st two years improvements made
the asbestos method led to the
blication of an interim proce-
re to be followed in Ontario, fol-
wing extensive inter-laboratory
ting to establish optimum sam-
ng and filtering methods.

In the microbiology section,
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ogenic compounds in water,
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llutants.

Laboratory staff examined
our problems arising from the
posal of organic liquid wastes
d developed several methods to
ntify offending compounds, in-
ding an odour kit for use in the
ld. The purging technique de-
oped for fish analysis was ap-
ed to the determination of odour
d taste-causing substances in
n. A positive tagging system
s developed from compounds of
musk family which permits de-
tion of underground leaks of
soline and fuel oil tanks.

Over their 20 years history, the
inistry's laboratories have
olved into a sophisticated and
diversified environmental tool.
The data generated by the labora-
ory enable the Ministry to assess
the progress being made in protect-
ing the environment, and alert the
public to the presence in the envi-
ronment of many exotic chemi-
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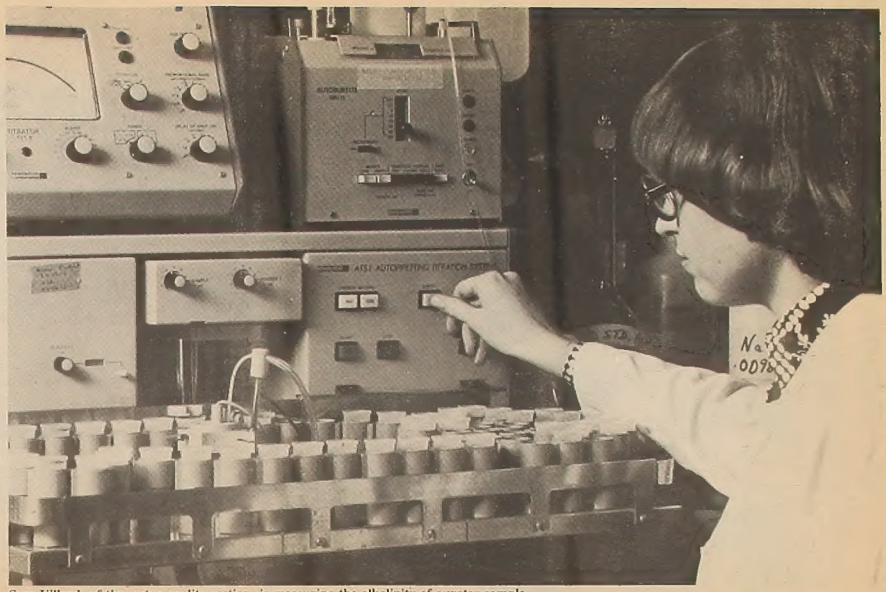
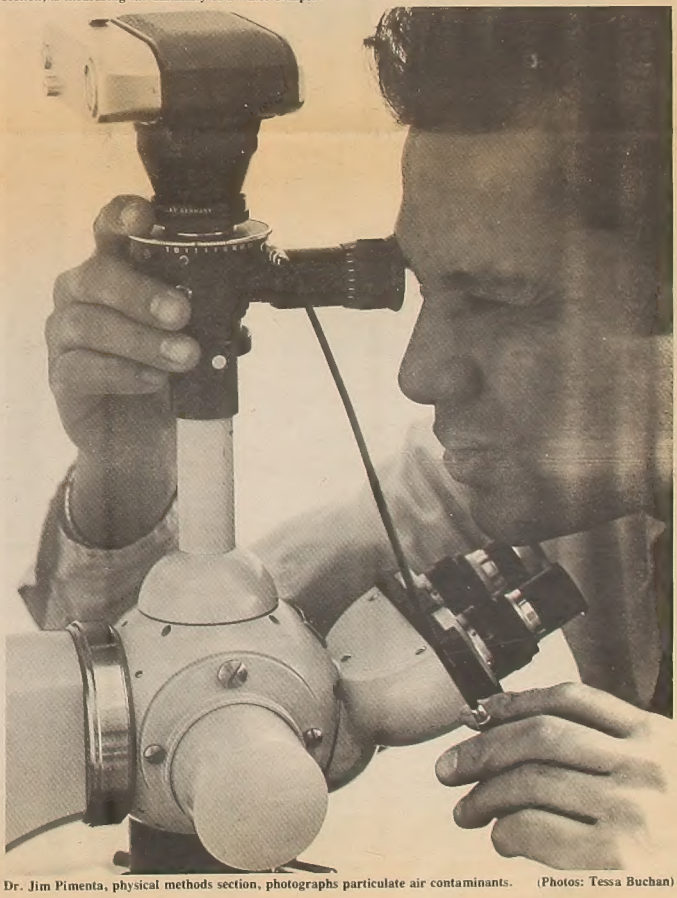


Serg Villard, of the water quality section, is measuring the alkalinity of a water sample.

nutagen testing in a sterile chamber.



Dr. Jim Pimenta, physical methods section, photographs particulate air contaminants. (Photos: Tessa Buchan)

# Old tires don't die or just fade away

(Photo: Rita Devgan)

By Rita Devgan

Where does a car tire go after it dies?

There was a time when you could find several of the unsightly dead monsters in every ravine and creek and in many other otherwise neat places. Seeing them, you realized that they would never disappear — as rubber does not decay. Aside from their visual impact, rubber tires also create other pollution problems. When used in landfill they trap toxic gases released from other decaying materials. They also have a tendency to "creep" out from under the rubble, break through the surface and push themselves into the foreground again, this time on a site that had been laboriously landscaped.

In the burning of old tires in incinerators, the temperature of the fires has to be increased, and the emission of noxious fumes created by this burning is hard to control.

## *toxic gases trapped*

During the past years the sight of discarded old tires in the most unlikely places, however, has become less frequent. Partly this may be due to increased environmental consciousness that makes most people think twice before throwing anything anywhere. But to a good part this is also due to a number of efforts made to develop effective ways to deal with the problem.

The ideal solution to the old tire problem is, of course, recycling by retreading. This is frequently done with truck and aircraft tires, mainly because the economy of a retread is more apparent in a tire that costs several hundred dollars.

Another way of recycling is the reprocessing of the material. The Goodyear Tire Company opened a tire reclamation plant in Bowmanville fifteen years ago to pioneer the re-use of the material from discarded car, truck, and tractor tires.

At the Bowmanville plant, old tires are first "aged" some more for a few years. They are then subjected to a cracking process, which grinds the rubber into a fine powder. At the same time, all the other materials involved in tire construction, such as steel wire and fabric meshes, are removed.

The rubber powder is then mixed with oil and formed into slabs. The slabs of recycled rubber are generally of lower grade than the original material, but they can very well be used in the manufacture of conveyor belts, floor mats, battery cases, and parts of tires less subjected to stress.

By handling about 750,000 tires per year the Goodyear plant produces sufficient reclaimed rubber for its own needs and can also supply the demands of other Canadian manufacturers of rubber products.

A possibly more efficient technique for producing recycled powdered rubber has been tested by National Rubber in collaboration with Union Carbide, reports Joe George, formerly of Metro Toronto Roads and Traffic Department. In this process, called cryogenic shattering, the tire is shredded into strips which are placed into liquid nitrogen at about -210 degrees C and compressed.

This process produces a finer powder with a wider range of application.

In 1977, National Rubber and Union Carbide proposed the use of this product, "crumb-rubber", in asphalt paving to the Resources Recovery, Energy, and Environment Committee of the City of Toronto. As the cost of asphalt had risen at the time, together with the cost of other petroleum products, the economics for the use of recycled rubber as asphalt extender seemed to be just right. This approach to produce crumb rubber is still under study.

At present, test strips of this rubberized asphalt mix are being studied by Metro Roads Dept. on several Toronto roadways at locations selected for their characteristics as slope, amount of moisture in the soil, speed of traffic, and others. Although crumb rubber in asphalt is initially more expensive, the results may prove it to be cheaper in the long-term.

The experiments have already proven that this new material is more durable, more crack-resistant, more flexible, and less likely to creep under heavy loads.

## *recycled rubber is asphalt extender*

A layer of asphalt only half as thick as regular asphalt has shown nearly double the lifespan of the conventional installation. The final acceptance of the new material depends on results of long-term tests now underway.

The University of Toronto's engineering department is investigating the most efficient composition of crumb-rubber asphalt under different roadway conditions. The Toronto experiments are also watched in other countries, especially in New Zealand and in Bermuda.

Environment Ontario which has an interest in reducing the accumulation of discarded tires, is working closely not only with Metro Roads and the U. of T., but also with the Ministry of Transportation and Communications. It is expected that the Waste Management Board of the Ministry will collaborate with M.T.C. during 1979, with the installation of a test strip of rubberized asphalt on a section of highway.

## *dry turf for sportsmen*

Other paved surfaces have been developed using crumb-rubber as one of the ingredients. Chevron Asphalt of Toronto has developed dry turf, a rubber combined with urethane and finished with a waterproofing coating of latex. This material has been used by the Toronto Board of Education as a base under play equipment in schools.

It has been found less dangerous than other hard surfaces to fall upon, and useful in areas where a sand base is too heavy (over parking garages) or too expensive to maintain.

Rubberized asphalt is also being used by both Chevron and Uniroyal for running tracks and tennis court surfaces. It has proven to be usable in all weather conditions. There are even indications that the surface is responsible for shorter running times because of its added bounce.

Other uses of discarded tires have been found and are applied in the United States. The US Bureau of Public Roads, for example, is replacing sand-filled barrels used on highways to cushion bridge abutments by stacks of old rubber tires to minimize the impact of cars going off the road against obstacles.

Goodyear has also conducted experiments in the use of rubber tires in another setting — as breakwaters in harbours which have generally been made as solid structures to deflect waves.

Although many methods of re-using tires are feasible and productive, the problems of gathering, transporting, and storing the millions of tires that are discarded every year across the province are still the major block in advancing tire-recycling. Until these efforts prove more lucrative, there will be limitations to the extent to which this resource can be recovered and made useful again.



## New controls on Steep Rock

Environment Ontario has served a Control Order on Steep Rock Iron Mines in Atikokan for the control of PCB contaminated soil in the mine area, Ron Gotts, Environment Ontario's Northwestern Regional Director, announced.

"The soil is contained in an environmentally safe area, but we are requiring the company to monitor groundwater for five years to confirm the containment of PCB's and to maintain a fence around the site to prevent public access," said Mr. Gotts.

In September 1976, 300 gallons of PCB oil were spilled on mine property during the movement of a transformer. The spill, undetected for four weeks, was subsequently reported and a clean-up under Ministry direction began immediately.

# Skywatch covers southern Ontario

*By Mary Ellen Lewis*

Next time you glance up at the sky and see a small aircraft overhead, smile . . . you may be part of an aerial photograph documenting pollution or another subject of environmental concern.

Spies in the skies? Not exactly. Just 85 volunteer women pilots of the Ninety-Nines Incorporated, (the international organization of women pilots), flying a series of airborne environmental patrols for Operation Skywatch '79, which took off across the province on June 14.

Environment Minister Harry C. Parrott launched the project at Buttonville airport with Central Regional Director Paul Cockburn, members of the Ninety-Nines First Canadian Chapter and Governor of the East Canada Section, Betty Jane Schermerhorn.

Dr. Parrott presented the pilots with first flight assignments and then took to the skies himself for a brief look at pollution from above. Regional directors in Hamilton, London and Ottawa simultaneously launched the project with local members of the Ninety-Nines.

During the summer and fall of 1979 most of Ontario south of a line connecting Parry Sound with Pembroke may be controlled for unusual water and air discharges, landfill site problems and research projects.

"We started the project in July 1978 as an experiment involving 20 women pilots in the Ministry's central region," said Mr. Cockburn. "During the first season we received reports and photos of problems on 15 sites, which we could not have pinpointed so quickly otherwise, and which led to further actions by Ministry personnel."

Regional offices prepare for the Ninety-Nines maps outlining targets for observation. They also provide cameras, film and training in basic environmental law and aerial photography. The volunteers donate the rest — their time, energy and the cost of operating their aircraft.

What's in it for the pilots? Betty Innes, Chairman of the First Canadian Chapter, says: "We all love to fly, but Skywatch gives us a chance to make a special contribution. Protecting the environment is important to us — as pilots and as concerned citizens."

Weather permitting, the pilots will be flying assigned routes until the end of October.

# Scientists seek answer from buried garbage

What happens to garbage after it's buried in a landfill site?

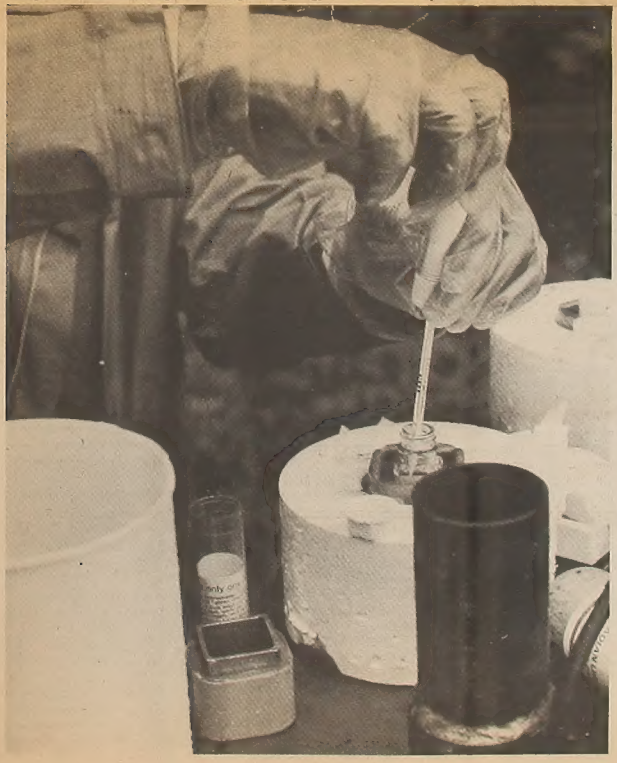
To continue a thorough scientific investigation of the answers to that question, $36,250 in Provincial Lottery funds have been awarded to the University of Waterloo Research Institute, Environment Ministry Harry C. Parrott announced recently. The funding, spread over two years, with an equal contribution from the federal government (Fisheries and Environment Canada, Inland Waters Directorate) will continue and complete a scientific investigation of the Camp Borden landfill site.

It includes investigation of leachate production — the liquid organic material flowing through the ground from the sites — decomposition of buried refuse, the migration or travelling of any compounds, and the ability of surrounding soil to hold or soak up any material or contaminants from the site.

The Camp Borden landfill site was chosen for study because of its age (40 years), the type of soil, the pattern of groundwater flow and the general geology of the area.

Any further knowledge gained in this study will be applied to the location and operation of other Ontario landfill sites.

"While we are actively developing reclamation processes to reduce material and energy waste and reduce the amount of landfill required, we must accept that sanitary landfill will be with us through the foreseeable future," Dr. Parrott said "It's important for us to continue scientific investigation of landfill effects so that we can continue to improve these operations."




(photos: Waterloo Research Institute)

**To determine spread of underground contamination from former garbage dump at Camp Borden, UW researchers are conducting a variety of subsoil tests. Above, Ed Sudicky, UW grad student, drills two-inch holes for point dilution tests. These tests involve a new technique used only a couple of times previously in Canada. Researchers drill a hole into which they place iodine 131, a radioactive iodine isotope. By measuring how quickly the radioactivity decreases (left), they can tell how fast underground water is moving through the soil. Because the radioactivity of the iodine 131 deteriorates in a matter of days there can be no contamination problem from the isotope itself.**

# Fish heart beat discloses water contaminants

Trout yearling photographed at the Environment Ontario laboratory aquarium. (photo: Tessa Buchan)

Electronic measurement of gill movements and of the heart beat of fish is one of the sophisticated biomonitoring techniques used in the studies of contaminants in drinking water in Brantford, Ont. Electrical signals will indicate changes in fish behaviour which can show the presence of contaminant concentrations too low to be measured by other means.

In addition live fish will be exposed to the water under controlled conditions and their flesh will be analyzed for a variety of contaminants.

In the Brantford project, conducted by International Environment Consultants on a two-year contract with Environment Ontario and funded through The Provincial Lottery, the new biomonitoring technique is used for the first time in Ontario. It allows a continuous measurement of the quality of the water supply and can indicate very low levels of biologically active contaminants that are readily taken up by living organisms.

The Brantford water treatment plant has been selected for the project because of recurrent taste and odour problems experienced with the municipal drinking water supply.

# Lend a hand...

*By Mary Ellen Lewis*

A giant hand reaches into a congested urban area and in one smooth swipe removes the garbage and smoke pollution as it restores the natural environment.

Far-fetched?

Not to Brenda Howard of Monck Public School, one of sixteen creative Muskoka students who submitted the winning posters, poems, essays and models to the Environment Ontario district office in Gravenhurst. They were selected from projects designed by 266 students in the 5th and 6th grades of 17 elementary schools for the education program, held in conjunction with the Muskoka school board.

Each participant received a Certificate of Merit and a "Keep Ontario Beautiful" crest. The winners were also given a day's boat tour of the Severn River with Regional Director Paul Cockburn and staff.

Environment Ontario officers have been visiting schools in the Muskoka and Haliburton areas for the past two years, with very impressive results. "The winners are chosen for their ability to express an idea within the framework of man in the environment," said Mr. Cockburn. "We prefer not to stress the competitive aspect too much. Our first priority is promoting environmental education in schools."

# Wishing wells recycle used oil


Judy Smith of Kitchener pours used oil into the Used Oil Well at Sears Auto Service, Fairway Road. (photo: Tessa Buchan)

A plan to recycle used motor oil, often dumped on the ground or in garbage cans by self-oil-changers, began in July with 13 oil wells set up in service stations throughout Kitchener-Waterloo.

Rather than waste a valuable resource, motorists stop at the nearest depot and pour the old crankcase oil into a 45 gallon drum called a "Used Oil Well", easily identified at most depots as an old-fashioned wishing well on wheels. When the drums are full, the oil is transported to a Breslau, Ont. refinery for cleaning and eventual reuse as industrial lubricant.

Ontario's Waste Management Advisory Board and Environment Canada are co-sponsoring the pilot project in conjunction with the Retail Council of Canada and the Ontario Petroleum Association.

"Together we have created the wishing well motif for the used oil depots, which I think is an eye-catching idea with an excellent chance of success," said Environment Minister Harry C. Parrott. "The 13 depots are set up at stations in diverse geographic locations in Kitchener-Waterloo to reach the population of 180,000."

Approximately 10 million gallons or 32 per cent of motor oil consumed in Ontario is purchased by do-it-yourselfers. Six million gallons, or 63 per cent of this amount, is recoverable. The rest is lost in use.

The project will run as a trial for at least one year. If motorists respond, Used Oil Wells may soon be seen across the province.